

### THREE NEW ORIENTAL SPECIES OF *JENKINSHELEA* MACFIE (DIPTERA: CERATOPOGONIDAE)

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*Abstract.*—Three new species of the predaceous midge genus *Jenkinshelea* Macfie are described and illustrated. One species, *J. niphanae* from Southeast Asia, is a typical member of the genus, whereas the other two species, *J. tokunagai* from Thailand and *J. setosiforceps* from Malaysia, are unusual in possessing wings with only a single radial cell. A key is given for the taxonomic separation of the five Oriental species of the genus.

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This review of the Oriental species of the predaceous midge genus *Jenkinshelea* Macfie is prompted by receipt of a large collection of midges from Keizo Yasumatsu that he took in rice paddies in Thailand as a part of his studies on the ecology of insects harmful to rice in that country. Although predaceous midges are not of primary importance in biological control of rice pests, their habits as predators of small chironomid midges and possibly cecidomyiids and other small Diptera may give them some small place in rice paddy economics. A report on the major portion of Yasumatsu's collection will be published elsewhere as studies progress.

*Jenkinshelea* is a rather small genus with ten described species from the Nearctic, Oriental, Afrotropical, and Australasian regions. A review of the generic characters and systematics of the Nearctic species was given by Grogan and Wirth (1977), in which an explanation of our terminology may be found. In the Oriental and Australasian regions only two species have previously been described: *J. setosipennis* (Kieffer) (1913) from India, and *J. papuae* Tokunaga (1966) from New Guinea. We are taking this opportunity to describe three additional species from Southeast Asia. The types are deposited in the U.S. National Museum of Natural History, Washington, D.C. (USNM); paratypes, as available, will be deposited in the B. P. Bishop Museum, Honolulu, Hawaii, the British Museum (Natural History), London, and the Thailand Institute of Scientific and Technological Research, Bangkok.

Genus *Jenkinshelea* Macfie

*Jenkinsia* Kieffer, 1913: 161. Type-species, *Jenkinsia setosipennis* Kieffer (original designation). Preoccupied by *Jenkinsia* Jordan and Evermann, 1896.

*Jenkinshelea* Macfie, 1934: 177 (new name for *Jenkinsia* Kieffer). Type-species, *Jenkinsia setosipennis* Kieffer (automatic).

Diagnosis.—A genus of large, usually grayish pollinose Sphaeromiine predaceous midges. Anal angle of female wing greatly expanded; wing with 1 or 2 radial cells, female with distal cell greatly elongated with costa nearly reaching wing tip; in male radial cell extending to 0.75 of wing length. Legs slender, femora unarmed; 4th tarsomere cordiform; 5th tarsomere of female with stout ventral batonnets, inflated on foreleg; female claws of all legs rather short, equal, each with a small blunt external basal tooth.

KEY TO THE ORIENTAL AND NEW GUINEA SPECIES OF *JENKINSHELEA*

- 1. Wing with 2 radial cells ..... 2
- Wing with 1 radial cell ..... 3
- 2. Legs yellow; hindbasitarsus short, tarsal ratio about 2.2; 5th tarsomere of female with 1 batonnet on foreleg, 4 on midleg, and 6–8 on hindleg; wing hyaline, crossvein r-m darkened; antenna with bases of flagellomeres pale ..... *setosipennis* (Kieffer)
- Legs yellow, narrow tip of hindtibia and all of tarsomeres 3–5 dark brown; hindbasitarsus elongate, tarsal ratio 3.5; 5th tarsomeres of female each with 4–8 batonnets; antenna uniformly dark brown ..... *niphanae*, new species
- 3. Thorax and legs dark brown, proximal tarsomeres (and in *papuae* bases of fore- and midfemora) paler ..... 4
- Thorax of female golden brown; legs yellow, only narrow apex of hindtibia and all of tarsomeres 3–5 dark brown; hindtarsal ratio of female 2.3 ..... *tokunagai*, new species
- 4. Female only; bases of fore- and midfemora pale brown; hindtarsal ratio 2.9 (New Guinea) ..... *papuae* Tokunaga
- Male only; femora and tibiae uniformly dark brown (Malaysia) ..... *setosiforceps*, new species

*Jenkinshelea niphanae* Grogan and Wirth, NEW SPECIES

Fig. 1 a–f

Diagnosis.—A medium sized species of *Jenkinshelea* distinguished by the following combination of characters: Females with 1 large ovoid spermatheca; wing hyaline with 2 radial cells, anterior veins light brown, posterior veins pale; flagellum dark brown; 5th tarsomeres bearing 4–8 batonnets; legs yellow.

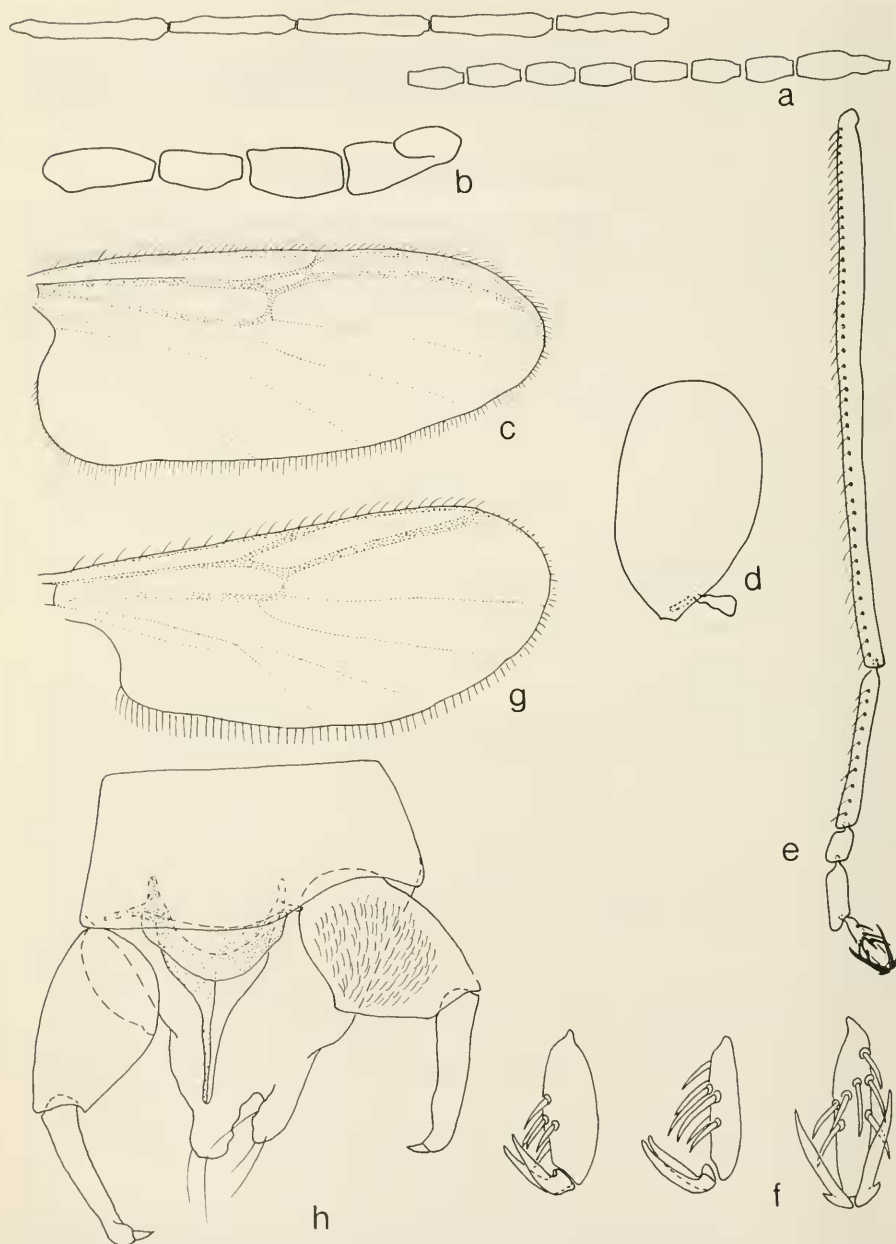


Fig. 1. *Jenkinshalea niphanæ*, female, a-f; *J. setosiforceps*, male, g-h. a, Antenna. b, Palpus. c, g, Wing. d, Spermatheca. e, Hindtarsus. f, Fifth tarsomeres and claws of (left to right) fore-, mid-, and hindlegs. h, Male genitalia.

Holotype female.—Wing length, 2.32 mm; breadth, 1.00 mm.

*Head:* Eyes bare, broadly separated (a distance of 0.05 mm). Vertex and frons dark reddish brown; clypeus and proboscis dark golden brown. Antennal pedicel reddish brown; flagellum (Fig. 1a) dark brown; proximal 8 flagellomeres subovoid, distal 5 flagellomeres more slender and elongated; flagellomeres with lengths in proportion of 20-12-11-12-12-12-14-14-28-32-33-33-45; antennal ratio 1.60. Palpus (Fig. 1b) light brown, 5th segment darker brown; lengths of segments in proportion of 7-9-10-9-13; 3rd segment with ventromesal patch of long slender capitate sensilla; palpal ratio 1.82. Mandible with 7 large coarse teeth.

*Thorax:* Light reddish brown. Mesonotum without anterior spine or pits; covered with fine pubescence and short sparse setae; scutellum with 4 bristles. Legs slender, yellow, unarmed; foretibia with dense apical patch of setae and dense comb with about 20 setae; midtibia with a single dark apical spine; hindtibia with heavy apical patch of setae and dense comb with 5 large setae and about 25 smaller setae; proximal 2 tarsomeres light yellow, distal 3 tarsomeres brown; basitarsus of midleg with 4-5 spines plus pair of apical spines; basitarsus of hindleg elongate, tarsal ratio 3.5; 1st and 2nd tarsomeres of hindleg (Fig. 1e) with dense palisade setae; 4th tarsomeres cordate, those of hindleg elongated (Fig. 1e); 5th tarsomeres (Fig. 1f) each with 4-8 ventral batonnets; claws equal with external basal tooth, hindclaws longer than fore- and midclaws. Wing (Fig. 1c) hyaline with broad anal angle and 2 radial cells as is typical for the genus; anterior veins light brown, posterior veins pale; costa extending to wing tip. Halter stem pale; knob white.

*Abdomen:* Reddish brown. One large ovoid spermatheca (Fig. 1d) measuring 0.150 mm by 0.090 mm, plus a small vestigial spermatheca.

Male.—Unknown.

Distribution.—China, Malaysia, Philippines, Thailand.

Types.—Holotype ♀, one ♀ paratype, Chiang Mai, Thailand, April-May 1958, V. Notonanda, light trap (type no. 76115, USNM). Other paratypes, 5 ♀ as follows: CHINA: Hainan Island, Ta Hian, 12 June 1935, 1 ♀. MALAYSIA: Sabah (N. Borneo), Tawau Residency, Kalabakan River, 30 mi W. of Tawau, 9-18 Nov. 1958, T. C. Maa, 1 ♀ (Bishop Museum). PHILIPPINES: Luzon, Pampanga Prov., Angeles, Clark Air Base, 15-22 Nov. 1957, I. Balatbat, light trap, 2 ♀. THAILAND: Chiang Mai, Amphoe Ban Pa Tong, Ban Thung Sieo, 19 Feb. 1979, K. Yasumatsu, in rice paddy, 1 ♀.

Discussion.—This species is named for Niphan Chanthawanich Ratana-worabhan of the Thailand Institute of Scientific and Technological Research, Bangkok, Thailand, in recognition of her numerous contributions to the study of ceratopogonid midges.

*Jenkinshelea niphanae* is distinguished from others in the genus by its single large functional spermatheca.

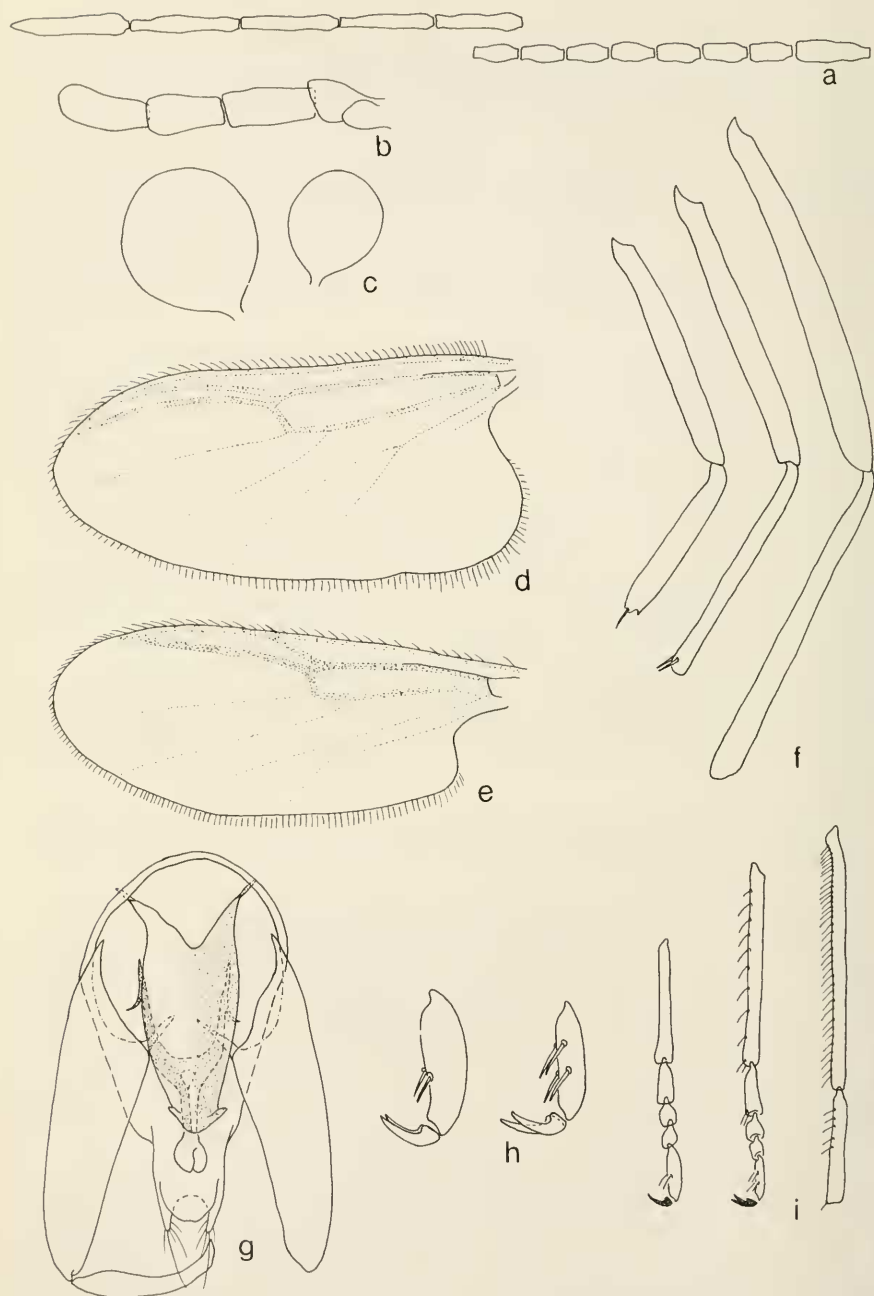


Fig. 2. *Jenkinshalea tokunagai*, female, a-d, f, h-i; male, e, g. a, Antenna. b, Palpus. c, Spermathecae. d-e, Wing. f, Femora and tibiae of (left to right) fore-, mid-, and hindlegs. g, Genitalia. h, Fifth tarsomeres and claws of foreleg (left) and midleg (right). i, Tarsi of (left to right) fore-, mid-, and hindlegs.

*Jenkinshelea tokunagai* Grogan and Wirth, NEW SPECIES

Fig. 2a-i

**Diagnosis.**—A small species of *Jenkinshelea* distinguished from other Oriental members of the genus except *J. setosiforceps* by the following combination of characters: Wing of both sexes with only a single radial cell; legs yellowish, only tarsomeres 3–5 and apex of hindtibia dark brown; males differ from those of *J. setosiforceps* in having a long slender aedeagus with long tapering basal arms.

**Holotype female.**—Wing length, 1.96 mm; breadth, 0.93 mm.

**Head:** Eyes bare, broadly separated (a distance of 0.07 mm). Vertex and frons dark golden brown; clypeus and proboscis lighter in color. Antennal pedicel reddish brown; flagellum (Fig. 2a) dark brown; proximal 8 flagellomeres subovoid, lighter brown on extreme basal portions, distal 5 flagellomeres more slender and elongated; flagellomeres with lengths in proportion of 21-13-13-12-13-12-13-13-25-27-27-31-34; antennal ratio 1.31. Palpus (Fig. 2b) light brown, 5th segment slightly darker; lengths of segments in proportion of 6-8-10-9-11; 3rd segment with 2 subapical ventromesal capitate sensilla; palpal ratio 2.2. Mandible with 7 large coarse teeth.

**Thorax:** Golden brown. Mesonotum without anterior spine or pits; covered with rather coarse pubescence and a few short setae; scutellum with 6 bristles. Legs (Fig. 2f) yellow, slender, unarmed; foretibia with dense apical patch of setae and dense comb; midtibia with 2 subapical spines; hindbitia with a moderately dense apical patch of setae and dense comb with 5 large setae and about 30 smaller setae; proximal 2 tarsomeres yellow, distal 3 tarsomeres of fore- and midlegs brown, distal 3 tarsomeres of hindleg lost; basitarsus of midleg (Fig. 2i) with 9 spines plus a pair of heavy apical spines; 1st and 2nd tarsomeres of hindleg (Fig. 2i) with dense palisade setae; tarsal ratio of hindleg 2.3; 4th tarsomeres of fore- and midlegs and presumably of hindleg cordate; 5th tarsomeres (Fig. 2h) of foreleg with only 1 pair of batonnets, of midleg with 4 batonnets; claws equal with basal external tooth. Wing (Fig. 2d) hyaline with broad anal angle but with only a single long radial cell which is quite atypical for the genus; anterior and posterior veins pale; costa extending to 0.98 of distance to wing tip. Halter pale brown.

**Abdomen:** Light golden brown. Two well-developed spermathecae (Fig. 2c) that are ovoid and unequal, the larger measuring 0.070 by 0.050 mm.

**Allotype male.**—Wing length, 1.07 mm; breadth, 0.62 mm. Smaller than holotype female, with generally similar coloring and features and with the usual sexual differences as follows:

Flagellum with sparse brown plume. Thorax darker brown. Fifth tarsomeres without batonnets; claws small and equal with bifid tips. Wing (Fig. 2e) with narrower anal angle; costa extending 0.83 of wing length.

Genitalia as in Fig. 2g. Ninth sternum very short with greatly curved base;



9th tergum tapering gradually distally, then becoming constricted at the base of the cerci that are long and slender and extend almost to tip of basimere. Basimere nearly straight, about  $4\times$  longer than broad; telomere slightly less than  $\frac{1}{2}$  length of basimere, curved and tapering slightly distally to broad, curved, pointed tip. Aedeagus heavily sclerotized,  $1.5\times$  longer than broad, basal arch  $\frac{1}{4}$  of total length; basal arms long and slender with pointed tips; distal portion narrowing then expanding to a hastate tip. Claspettes fused; basal arm heavily sclerotized and recurved  $180^\circ$ ; distal portion divided with short blunt tips bent ventrad and more lightly sclerotized than remainder.

Distribution.—Thailand.

Types.—Holotype ♀, allotype ♂, Chiang Mai, Thailand, April–May 1958, V. Notananda, light trap (type no. 76116, USNM). Paratypes, 12 ♂, Thailand, Chiang Mai, Amphoe San Pa Tong, Ban Thung Sieo, 19 Feb. 1979, K. Yasumatsu, in rice paddy.

Discussion.—This species is named for Masaaki Tokunaga in recognition of his many contributions to our knowledge of the ceratopogonid midges of the Orient and Pacific.

*Jenkinshalea papuae* Tokunaga, known only from a female from New Guinea, also has the wing with one radial cell and has two large functional spermathecae, but the New Guinea species has dark brown femora and tibiae and the hindtarsal ratio is 2.9. *Jenkinshalea setosiforceps*, known only from the male from Malaysia, has one radial cell, but is a dark brown species with dark brown femora and tibiae, and the male genitalia are unusually short and broad, with densely setose basistyle and transversely arcuate aedeagus.

*Jenkinshalea setosiforceps* Grogan and Wirth, NEW SPECIES

Fig. 1 g–h

Diagnosis.—A small species of *Jenkinshalea* distinguished from all other members of the genus except *J. tokunagai* by the following combination of characters: Wing with only a single radial cell; males differ from those of *J. tokunagai* by their genitalia with dense setae on the mesal surface of the basimere and their short, half-moon shaped aedeagus.

Female.—Unknown.

Holotype male.—Wing length, 1.02 mm; breadth, 0.43 mm.

*Head*: Eyes bare, broadly separated (a distance of 0.07 mm). Entire head including palpus brown. Antennal pedicel dark brown; flagellum light brown; plume dark brown, sparse. Palpus shriveled, segments not measurable.

*Thorax*: Medium brown. Mesonotum without anterior spine or pits, covered with rather long pubescence and a few larger setae; scutellum with 4 bristles. Legs brown; 4th tarsomeres cordate; 5th tarsomeres without ventral batonnets; claws small, simple, equal sized. Wing (Fig. 1g) hyaline with

moderately narrow angle but only a single long radial cell; anterior veins light brown, posterior veins pale; costa extending to 0.95 of wing length. Halter brown.

*Abdomen:* Brown. Genitalia as in Fig. 1h. Ninth sternum about twice as broad as long with straight base; 9th tergum tapering rather abruptly before becoming constricted at the cerci which extend beyond basimeres. Basimere straight, about  $1.5\times$  longer than broad, mesal surface with dense strong setae; telomere nearly the length of basimere, nearly straight, tapering only slightly distally, tip curved and pointed. Aedeagus heavily sclerotized and reduced, half-moon shaped without basal arms or distal extensions. Claspettes fused; basal arm heavily sclerotized with subbasal lateral extensions; distal portion divided with long slender tips.

*Distribution.*—Malaysia.

*Type.*—Holotype ♂, Malaysia, Kuala Kengrong, Girik, Perak, 14 April 1958, R. Traub, light trap (type no. 76117, USNM).

*Discussion.*—The male genitalia of this species are quite unusual for the genus in being short and squat and having dense coarse setae on the mesal surface of the basimeres, from which the species derives its name.

#### LITERATURE CITED

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